# ELECTRICAL ENGINEERING IN SLOVAKIA IN 2008

## An Industry Analysis

A Project for

the Ministry of Economy of the Slovak Republic

*Bratislava, September 2009*

# 2008 Slovak Electronics Industry Profile

**Industry Analysis, TREND Analyses, July 2009**

## Industry Profile and Its Economic Characteristics

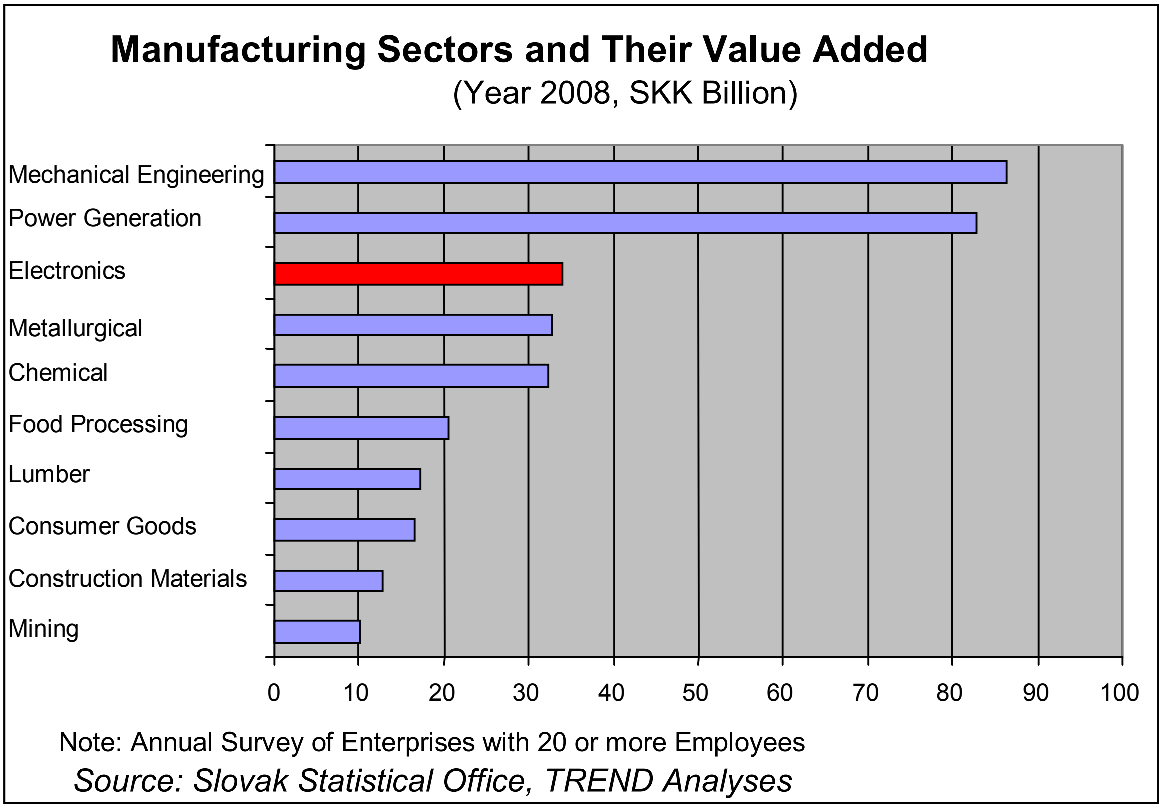
Electronics Industry (further EI) is one of the most significant and dynamic industries of the Slovak industrial landscape. After years of deep production declines in the first half of the nineties of the twentieth century, that fully uncovered the lagging of domestically designed and manufactured electronics behind the dominant global trends, the manufacturing volumes have been growing steadily for more than a decade - more than in any other industry of the Slovak economy.

For the last ten years (since 1998), the number of employees in the industry doubled, revenues increased more then seven-fold, and value added four-fold. For the most part, foreign corporations can be credited for the turnaround, either as a result of greenfield development or purchase of defunct manufacturers‘ assets. Some of the newly developed production facilities were designated European corporate manufacturing centres. Electronics sector, next to car manufacturing, is thus becoming the second most significant driver of the manufacturing sector and its significance within the economy of Slovakia is increasing.

The Slovak Statistical Office 2008 electronics industry data shows 222 companies with 20 and more employees. That represents an increase of fifty in the last five years. Only mechanical engineering and food processing industries have more companies. Total EI revenues rank the industry third behind mechanical engineering and power generation & transmission industries. Number of employees – more than seventy thousand – make EI second largest employer behind mechanical engineering. At the same time, it is the second largest exporter (again, behind mechanical engineering); However, a large portion of industry’s inputs are imports, thus decreasing the net positive contribution to Slovakia’s trade balance.

Besides its contribution to overall employment, the best picture of its real significance for the national economy can be gathered from its value added. It is not as imposing as its revenues and exports numbers – nevertheless, even value added already ranks EI to be the third most significant industry of the manufacturing sector – lagging greatly behind power generation & distribution and mechanical engineering, and only closely surpassing metallurgical and chemical industries.

Importantly, considering its future development potential, it is no longer the low cost labour that attracts global and regional players; these players now seek conditions to establish hubs for their future business growth – including technical support, service, and infrequently for the time being, design centres, or even research and development. These trends, coupled with industry tradition and quality university programs in the field, provide further opportunities for EI growth. This will become even more important as the initial factors that attracted foreign investors are no longer available (low cost labour in the centre of Europe), and these investors contemplate their effectiveness of remaining in Slovakia.




Rapid industry growth was interrupted by economic slowdown at the end of 2008, which turned into a full-blown recession in 2009. Especially companies manufacturing components, parts and raw materials experienced dramatic decline in new orders, particularly in the period between October and December of 2008. The levels of new orders are still lower this year than they used to be, however not as low as in the fall of 2008. The period from September 2009 to December 2009 – when most electronics is sold - will be the most important indicator of consumer sentiment. While there are companies still not fully recovered from the drop in the level of new orders, there are also companies that were strengthened by the current crisis. Conceivably, these companies could use the market conditions to improve their market position or position within their group of companies.

The recession ended – or more likely, just temporarily interrupted – a period of double-digit EI growth in exports, revenue, and since 2006 also value added. The industry growth rate significantly outperformed the average manufacturing sector growth rate for longer periods of time. The year 2008 recorded a slowdown resulting in industry's first decrease in total value added in more than a decade.

Last year was exceptional for the industry not only because of the economic situation, but was also made exceptional by the introduction of the new currency - Euro. Strong appreciation of the old currency prior to currency conversion, that was reflected in the conversion rate into Euro, made situation even more complicated for companies with labour intensive manufacturing. The main, or at least very important, comparative advantage of Slovakia – low cost labour – started disappearing faster than expected. Thus year 2008 can be seen as one of the industry milestones and the beginning of the cleansing process.

Some manufacturers, especially labour intensive manufacturers and components and parts manufacturers, started, as expected, relocating from Slovakia, or at least reducing local capacities and numbers of employees. Increased Euro denominated labour costs were not offset by the newly acquired advantage – zero foreign exchange risk vs. the rest of the Euro zone. As a result, EI started shedding, at least partially, productions with low value added per employee.

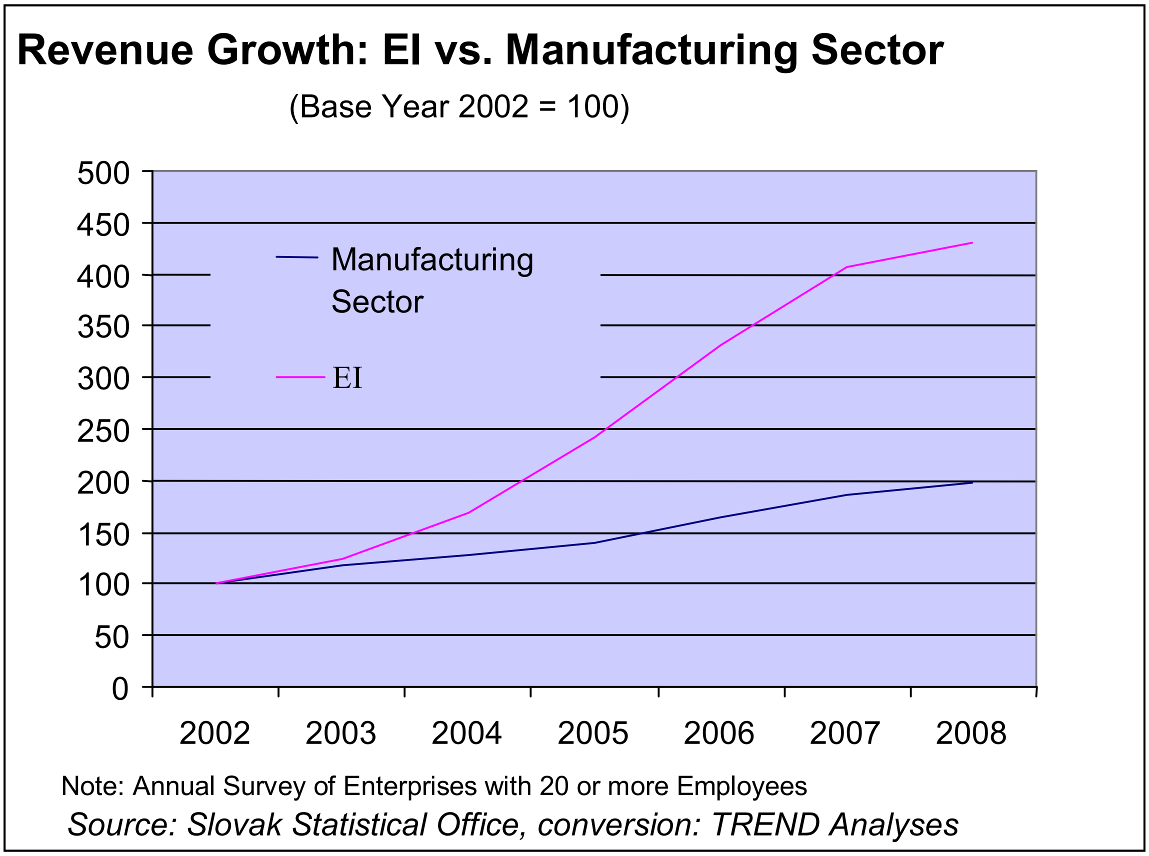
While we do not have accurate statistics for the entire industry, since statistics for small companies and individuals are only estimated by the statistical office, we believe industry totals can be approximated using statistics for medium-sized and large companies with 20 and more employees. These companies employ more than three quarters of all industry employees and earn approximately 90% of all revenues. Since monthly and quarterly data are mostly subsequently adjusted or inaccurate, we will be using the more reliable annual data from the Slovak Statistical Office.

## Revenues

Total revenues for EI experienced a double-digit growth for the most part of this decade. Revenues grew between 36% and 44%, after Samsung Electronics Slovakia - the largest industry manufacturer - in Galanta, launched its operations between years 2004 and 2006. The growth was driven particularly by finished products assembly (TV sets, DVD recorders/players), but also by manufacturing of components and parts for the car manufacturing industry (electric motors, cable harnesses etc.). The overall growth rate decreased to 23% in 2007 and significantly decreased to 6% under recessionary pressures in 2008. Of last year's revenues of SKK 277 billion (9.2 billion Euros), almost 85% were exports (7.8 billion Euros after conversion using actual conversion rate).

Finished products assembly – especially manufacturing of LCD TVs and monitors, which constitutes in excess of one half of all EI revenues – do not represent a true picture of the productivity growth of the industry and its contribution to Slovakia's GDP growth as more than 90% of its inputs are purchased (mostly imported).

While the decrease in revenue growth can be largely attributed to the ("recessionary") last quarter of 2008, it was not the only reason for the decrease. The recession just made the long term trend in revenues more pronounced. Most large electronics manufacturers in Slovakia (Samsung, Panasonic, Emerson, SE Bordnetze and others) already became fully operational and approach their theoretical capacity. However, some manufacturing segments – TVs and LCD panels are expected to revive in the next couple of years and experience significant growth in revenues and exports that should more than compensate for the loss of manufacturing of cable harnesses that is slowly losing its competitive cost advantage.




## Value Added

Despite the fact, that revenues are the most followed economic measure, a more realistic picture of EI productivity can be gleaned from value added data. While the EI share of manufacturing revenues for enterprises with 20 or more employees is 14%, its share of manufacturing sector exports exceeds 20%, however, its share of value added is less than 10%.

Between the years 2003 and 2007, the EI value added increased most of all manufacturing sector industries – it more than doubled. Value added growth was put on hold in 2008, when it contracted by 4% (similarly to the rest of the manufacturing sector) to SKK 34 billion (or 1.1 billion Euros). The first signs of value added deceleration could have been spotted already in 2007, when its growth slowed down from the record-breaking 36% in 2006 to only 5.5%, especially as a consequence of downward price adjustments for LCD TVs, which significantly cut manufacturers' profit margins.

Slower growth of value added in comparison to revenues is a result of expansion in finished products assembly productions, which have only a small value added component, albeit they earn high revenues. The value added component of EI production was in excess of 20% up until and including 2004, however only 13.5% in 2007 and decreased to 12% in 2008. This trend is likely to continue into the future, but at a slower pace.

| ELECTRONICS INDUSTRY | 2006 | 2007 | 2008 | 2007/06 (%) | 2008/07 (%) |
|---|---|---|---|---|---|
| Revenues Total (SKK million) | **212 444** | **261 231** | **295 515** | **23,0** | **6,0** |
| Revenues for Products/Services (SKK million) | **203 423** | **252 390** | **263 203** | **24,1** | **4,3** |
| Value Added (SKK million) | **33 458** | **35 315** | **34 000** | **5,5** | **-3,7** |
| Profit/Loss (Before Tax, SKK million) | **9 815** | **6 014** | **3 000** | **-38,7** | **-50,0** |
| Number of Employees (converted to full-time) | **60 567** | **66 126** | **70 380** | **9,2** | **6,4** |
| Average Monthly Salary (SKK) | **17 786** | **19 005** | **19 990** | **6,9** | **5,2** |

Note: Annual Survey of Enterprises with 20 or more Employees; Statistical Office data enhanced by TREND Analyses with data for new production facility of Samsung in Voderady, that was not included in the 2008 statistics – revenues and numbers of employees data. Value added and profits are TREND Analyses estimates

*Source: Slovak Statistical Office, TREND Analyses*

Renewed growth of value added in the industry in the next couple of years could be triggered by new local suppliers to existing finished products manufacturers. LCD panels are one such example of a semi-finished product, as it constitutes up to 70% of the value of a TV. A Samsung LCD manufacturing facility in Voderady became operational last year. This facility is expected to reach its planned capacity of 10 million panels annually. In addition to Samsung, similar facilities are being prepared by the Taiwanese AU Optronics in Trenčín, and considered by another Taiwanese manufacturer Chi Mei, for now undecided. However, even these manufacturers purchase and mostly import most of their inputs. Thus, revenues should grow at a much higher pace than value added of the domestic electronics industry.

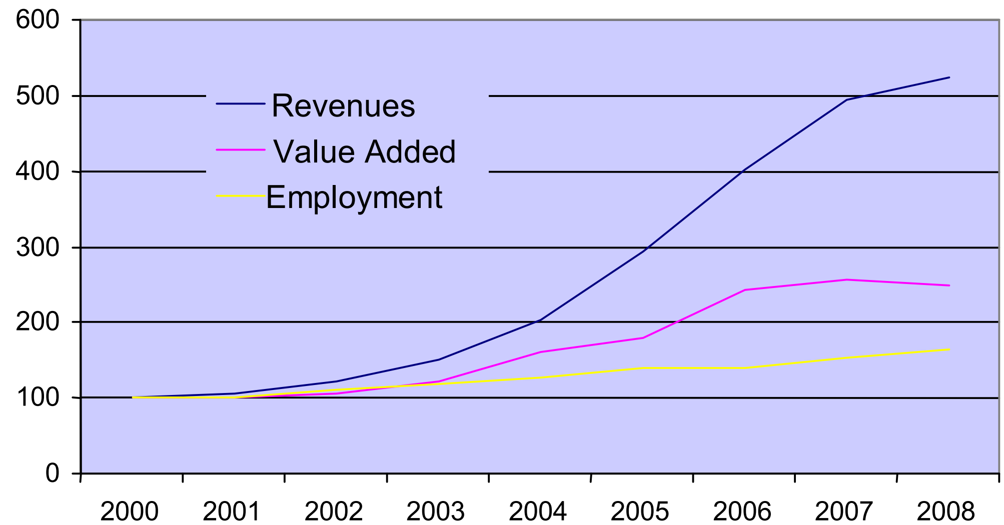
## Employment

Employment goes hand in hand with value added. It grew faster than value added for the second year in a row. The industry added approximately 10 thousand jobs in the past two years. More than two hundred companies with 20 or more employees employed more than 70 thousand employees last year. Employment grew by 9% in 2007 and by more than 6% in 2008. This growth was not accompanied by an equivalent growth in value added and represents an unfavourable decrease of the industry productivity ratio.

As a result, since such development does not allow for salary increases, average salaries in the industry increased (nominally by +6.9%) slightly less than the overall Manufacturing Sector increase (by +7.5%).). The 2008 difference was even more pronounced (+5,2 % versus 6,3 %). The strong conversion rate of the currency probably aided this development to some extent, as labour costs in Euro terms increased faster than expected; a fact felt by export oriented industries more than others. The average gross salary of an EI employee was almost SKK 20 thousand, i.e. EUR 665, which was less than the overall manufacturing sector salary by almost SKK four thousand, i.e. EUR 130.

**Growth in Revenue, Value Added and Employment In the Electronics Industry**

(Current Prices, Base Year 2000 = 100)




Note: Annual survey of enterprises with 20 or more employees

*Source: Slovak Statistical Office, TREND Analyses*

Significant economic slowdown experienced at the end of 2008 had almost no effect on employment. It was, partially, because the managements believed in early turnaround in new orders, and partially, because the first round of layoff notices did not yet take effect. The only sub-sector affected before the end of 2008 was one of the largest employers in the industry – manufacturers of the cable harnesses. These manufacturers take advantage of the low labour cost in Slovakia and remain among the largest employers in the industry, giving work to approximately 20 thousand people. Their share of the industry continues to decrease annually. Since they were the first ones to be affected by the crisis in the automotive industry, they were also the first ones to start terminating their term contract workers.

Bucking the trend, employment increases were reported in some newly built facilities (Magneti Marelli in Kechnec and Samsung in Voderady), but also other previously established, but still expanding consumer goods manufacturers (Sony) and even some cable harnesses manufacturers (Yura – former Sewon).

The recession and the relatively strong conversion rate of the SKK inevitably accelerated the expected process of gradual transfer of simple manual labour intensive productions from Slovakia to other lower cost countries. Most of the expanding and new enterprises represent manufacturers with higher productivity (value added per employee) – such as consumer electronics, electric motors, computer chips and power supplies. These productions utilize more workers with specialized higher secondary and electronics engineering education. However, because most of the inputs come from outside of the electronics industry itself (i.e. chemical products, mechanical engineering etc.) they do not make a significant contribution to the aggregate value added of the electronics industry. Their positive effect on the economy and employment is hidden in the performance of other industries.

## Profitability

The continuous gains in revenues and employment in Slovakia's electronics industry are almost taken for granted, however its profitability is far less impressive. While the industry's share of total revenues of the manufacturing sector is 14%, its share of profits was 4% in 2007 and even less, just over 2% in 2008. Aggregate profits of the companies belonging to the industry fell from SKK 6 billion in 2007 to approximately half last year.

Among the reasons for this trend are constant advancements in new product development rendering current products antiquated in tandem with increasing price pressures and decreasing margins. Financial results of Samsung in Galanta are the best example of this trend. After helping to increase the overall profitability of the industry in 2006, its 2007 and 2008 profitability helped moving the overall numbers again – this time in the opposite direction. Traditionally, profitability is low in the electrical apparatus and instrument sector, which includes manufacturers of cable harnesses. Many of these manufacturers incurred losses as early as in 2007 to fare even worse in 2008.

Most of the companies with high share of manual labour input are adversely affected by the appreciation in the exchange rate of the SKK vs. the Euro before the conversion rate became fixed. As a result, thanks to a single factor, their personnel and other costs increased by almost 30% when converted to Euro. Since the absolute majority of the production is manufactured directly for exports (and some indirectly – e.g. Inputs for car manufacturers), the pricing was fixed in Euros some time in advance. This put manufacturers under strong price pressure. Exchange rate risk for most export markets almost disappeared after the adoption of Euro, which should become a comparative advantage against neighbouring countries.

Profitability of individual production plants in Slovakia can be partially misleading, since they are subsidiaries of global manufacturers. Some of the local production plants report only token profits, even losses, while in reality belonging among the most efficient within their corporations. Since transfer pricing typically only allows for minimum profit margin for subsidiaries, significant foreign exchange movements can push even otherwise efficient subsidiaries into losses. More accurate numbers can be expected for 2009 when transfer pricing for local subsidiaries should reflect the actual conversion rate into Euro.

| Slovakia’s TOP 20 Comanies of Electronics Industry SR in 2008 | | | | |
|---|---|---|---|---|
| | | **Revenues** (SKK -`000) | **Value Added** (SKK -`000) | **Employees*** |
| 1. | Samsung Electronics Slovakia, s.r.o., Galanta | 102 185 374 | N/A | 4 671 |
| 2. | Sony Slovakia, s.r.o., Nitra | 42 116 148 | N/A | 3 702 |
| 3. | Samsung Electronics LCD Slovakia, s.r.o., Voderady | 6 843 577 | N/A | 592 |
| 4. | Emerson, a.s., Nové Mesto nad Váhom | 5 705 833 | 972 759 | 1 376 |
| 5. | Panasonic AVC Networks Slovakia, s.r.o., Krompachy | 5 554 225 | 1 224 992 | 1 200 |
| 6. | BSH Drives and Pumps, s.r.o, Michalovce | 5 350 139 | N/A | 1 069 |
| 7. | SE Bordnetze – Slovakia, s.r.o., Nitra | 4 982 840 | N/A | 2 303 |
| 8. | Leoni Autokabel Slowakia, s.r.o., Trenčín | 4 038 235 | 1 106 726 | 3 369 |
| 9. | Osram Slovakia, a.s., Nové Zámky | 3 791 461 | N/A | 2 191 |
| 10. | Delphi Slovensko, s.r.o., Senica | 3 560 070 | 459 658 | 1 700 |
| 11. | Askoll Slovakia, s.r.o., Nové Mesto nad Váhom | 3 551 155 | 598 498 | 953 |
| 12. | Panasonic Electronic Devices Slovakia, s.r.o., Trstená | 3 373 984 | 813 507 | 1 459 |
| 13. | Delta Electronics (Slovakia), s.r.o., Dubnica nad Váhom | 2 933 053 | N/A | 747 |
| 14. | Universal Media Corporation (Slovakia), s.r.o., N. Mesto n/Váh. | 2 680 887 | 322 092 | 468 |
| 15. | Hansol LCD Slovakia, s.r.o., Voderady | 2 611 975 | 178 721 | N/A |
| 16. | Molex Slovakia, a.s., Kechnec | 2 348 156 | 612 100 | 924 |
| 17. | Semikron, s.r.o., Vrbové | 2 114 982 | 439 261 | 568 |
| 18. | Hella Slovakia Front-Lighting, s.r.o., Kočovce | 2 048 568 | N/A | N/A |
| 19. | Yazaki Wiring Technologies Slovakia, s.r.o., Michalovce | 1 961 338 | N/A | 1 940 |
| 20. | SEWS Slovakia, s.r.o., Topoľčany | 1 747 536 | 386 874 | 1 538 |

* Average number of employees, including employment agencies

Note: Some corporations did not publish their preliminary financials in time for this analysis (July) and were not included in the table.

*Source: TREND Analyses*

## Sub-Industries

Standard industry classification (Odvetvová Klasifikácia Ekonomickej Činnosti – further OKEČ) subdivides Slovak Electronics Industry into the following sub-industries:

**30 Electronic Office Equipment and Computers Manufacturing**

**30.01** Electronic Office Equipment Manufacturing

**30.02** Computers and other Data Processing Equipment Manufacturing

**31 Other Electric Machines and Devices Manufacturing**

**31.1** Electric Motors, Generators and Transformers Manufacturing

**31.2** Power Distribution and Switchgear Apparatus Manufacturing

**31.3** Insulated Wires and Cables Manufacturing

**31.4** Capacitor, Galvanic Cell and Battery Manufacturing

**31.5** Electric Lamp Bulb and Fixtures Manufacturing

**31.6** Electric Equipment for Motors Vehicles and All Other Electric Equipment Manufacturing

**32 Radio Television and Communications Equipment Manufacturing**

**32.1** Electron Tubes, Gas Filled Tubes and Other Electric Component Manfacturing

**32.2** Radio, Television Broadcasting Equipment and Telephone Telegraph Apparatus Manufacturing

**32.3** Audio and Video Equipment Manufacturing

**Partial OKEČ 33 Electro medical Electrotherapeutic, Precision and Optical Apparatus, Watch and Clock Manufacturing**

**33.2** Instruments Manufacturing for Measuring, Controlling, Testing, Navigation and Other Instruments Except for Instruments for Industrial Process Variables

**33.3** Instruments Manufacturing for Controlling Industrial Process Variables

Most job opportunities within EI are afforded by Other Electric Machines and Devices Manufacturing sub-industry (OKEČ 31). Companies classified in this category employ more than two thirds of all the employees of the industry. The larger proportion of employment is also reflected in value added created and its more than 50% share of all outputs generated by the overall electronics industry. This sub-industry recorded a three percent employment growth in

2008; however the total value added did not increase. Productivity of the electronics industry is mostly driven by Radio Television and Communications Equipment Manufacturing. A couple of strong performers can also be found in Precision Apparatus Manufacturing, which has a potential for growth thanks to technologically sophisticated products.

**Electronic Office Equipment and Computers Manufacturing (OKEČ 30)** is the smallest sub-industry of the electronics industry. According to the Slovak Statistical Office there are only ten companies with 20 or more employees, grossing SKK 4.5 billion (150 million Euros) in revenues annually. Within the EI this sub-industry excels in terms of its share of value added and strong profitability.

**Elcom**, a manufacturer of cash registers and POS systems, located in Presov is the best known representative of the sub-industry. Its market share in its category in Slovakia is more than 80%. As a general rule, more than three quarters of its products are exported. Year 2008 was particularly profitable as a result of retailers' preparations for conversion to the Euro.

Second in terms of revenues, but most significant in terms of employment and its contribution to the GDP, and therefore the most significant sub-industry of the EI is the **Other Electric Machines and Devices Manufacturing (OKEČ 31)** sub-industry. Almost two thirds of all companies in the industry are classified in this category. While their share of industry's revenues is less than one third, they generate more than a half of its value added, which is a consequence of a high, almost two thirds (50 thousand), share of total employment. High numbers of employees compensate for the fact, that firms in this sub-industry have a lower productivity (per employee) and correspondingly lower salaries.

The sub-industry is still dominated by manufacturers of the cable harnesses that revived the industry in the nineties and even to this day employ a 20 thousand army of employees. Salary growth, but mostly currency appreciation caused half of the companies in two sub-industries, of which the cable harnesses manufacturers are part, to report losses in 2007. Year 2008 was no different and the total losses reported increased further. It is not fully clear from the available data, which of the companies face existential problems. Similarly to the circumstances surrounding transfer pricing, the full extent of the situation will become clearer from the 2009 data.

In addition to the large group of cable manufacturers, the largest company in the sub-industry is **BSH Drives and Pumps** in Michalovce. The electrical motor manufacturer belongs to Siemens group of companies. Even this subsidiary reported a decrease in revenues of more than 10%. Automotive supplies are still significant within this sub-industry. Former joint venture between the U.S. Dana and Emerson DEAS to manufacture electrical motors for automobile power steering in Nove Mesto nad Vahom belongs to the U.S. Company TRW now, and can benefit from the recession by relocating productions from the U.K. An expansion production hall was put on hold for now. One of the smaller companies in the sub-industry, **Hydac** from

Germany, is planning to expand their electromagnet production for industrial and automotive use.

The river Vah region was selected as a location for a group of **Emerson** subsidiaries. One of them produces a wide range of components for household electronics and power supplies. The other one, which used to produce electrical motors for household appliances, was sold to **Askoll** from Italy last year. Similarly to BSH in Eastern Slovakia, this subsidiary also reported more than a 10% decrease in revenues.

Taiwanese **Delta** and the U.S. **Power One** specialize in power supplies manufacturing and this is becoming an expanding sector of the industry. Delta grew by one third last year, and it is therefore very likely going to expand its facilities. **Eltek,** from Norway, set up their European centre for power supplies manufacturing in Liptovsky Hradok. Power supplies are also one of the main products of one of the largest domestic electronics manufacturers, **Eltec** in Zilina.

Lighting and components also belongs to significant sub-industries, expanding not only as a consequence of orders from automotive industry. The biggest player in the field is **Osram**, light bulb and gas-discharge light manufacturer. Osram increased its revenues by more than a third in 2008. Siemens, its German parent company, keeps gradually relocating more of their higher value producing manufacturing from Germany, but also increasing is its research and development at the location. Possibly, only deliveries to automotive industry could buck this growing trend. Additional production should be relocated from the United States in 2009. **Hella** belongs to one of the largest groups in the lighting component sector. Its plants are in Kočovce and Bánovce nad Bebravou, and both produce particularly for car manufacturers' facilities in Slovakia. **OMS** in Dojč, a domestic manufacturer of office and industrial lighting and components located in the Zahorie region, reports a strong growth and is the largest producer in its segment in Central and Eastern Europe.

Most of the revenues of the electronics industry, however with a low portion of value added comes from **Radio Television and Communications Equipment Manufacturing (OKEČ 32).** Despite the falling profitability in the last year this sector continues being one of the driving forces of the entire industry. This can be mainly attributed to a rapid growth in LCD television manufacturing in European manufacturing centres of two key companies: the Korean Samsung and the Japanese Sony. Samsung Electronics Slovakia in Galanta is all by itself generating fully one third of all revenues of the Slovak electronics industry and is the largest company in the industry. Its share of value added is significantly lower; it is nevertheless the leader of the industry, despite lack of growth and reporting losses last year. Sony Slovakia belonged to one of the best performers of 2008, increasing revenues by 44% year over year. Universal Media Corporation – a smaller manufacturer of lower cost LCD TVs also reported growth in revenues by thirty percent and disclosed aggressive plans to grow its output to millions of TVs per year.

LCD manufacturing industry has been the largest contributor to the growth of the Slovak electronics industry and is expected to continue doing so. Samsung in Galanta will soon begin manufacturing of new LED TVs that should again make the company more efficient and profitable. While Sony in Nitra doubled its production output, declining prices of electronics goods caused its revenues to grow more moderately. Together, the three assembly plants produced more than 9 million LCD and Plasma TVs and monitors. Production should increase again significantly either this or next year as Sony, in its new plant in Nitra, already completed its expansion and is planning to relocate all of its production from its Barcelona facility slated to be closed in 2010. Investment plans from the period before recession put capacity increases of the Nitra facility to 6 million from 4 million televisions annually for 2009, with the perspective of an increase up to 10 million in the following years. This 240 million Euros investment that should have brought operations with higher value added was put on hold indefinitely, at least for now. Unofficially, Trend Analyses estimates the hold might not last too long. Nitra is also the destination of other Sony suppliers, presumably from other industries.

The significance of the sub-industry for the domestic economy should be further strengthened by the introduction of LCD panel manufacturing. This critical component of LCD televisions was previously exclusively imported from Asia; this however is becoming less feasible in the long run. The first two million panels were produced in the new facility of **Samsung Electronics LCD Slovakia** in Voderady near Trnava in 2008. These panels were shipped mostly to Samsung and Sony assembly plants. Production volumes should multiply in the following years. A similar investment by global number three of LCD panels **AU Optronics** is being contemplated (in the amount of more than 200 million Euros) – however details are being re-evaluated due to the uncertain market conditions. These plans could turn into reality possibly in 2010. Taiwanese Chi Mei has not made its decision with respect to investing in Slovakia yet.

A crucial role in the sector, currently dominated by LCD television manufacturing, is also being played by producers of DVD recorders and consumer electronics components in two subsidiaries of the Japanese manufacturer **Panasonic** in Krompachy and Trstena.

Strong growth in previous years was reported by Electron Tubes, Gas Filled Tubes and Other Electric Component Manufacturing sub-industry, however only on paper and due to the incorrect classification of Sony Slovakia. The reality is much less positive, the sub-industry is facing the consequences of falling sales and mounting price pressures for CRT televisions and monitors as electron tubes production is critically dependent on sales of these products. **LG Philips** projects involving the sub-industry collapsed and production had to be cancelled by the domestic manufacturer **OVP** in the spring of 2008. Simply put, the sub-industry is shedding its non-viable productions. Some representatives of the sub-industry had to partially or in full change their product range to mechanical engineering (**Punch** in Námestovo, **Tesla** in Liptovsky Hrádok and Stropkov). **Semikron** on the other hand, is one of the growing companies with perspective that are increasing the output and profitability of the industry**.** This subsidiary of the German parent company, besides manufacturing the traditional low-voltage diodes, continuously keeps adding more sophisticated chip, transistor, thyristor and diode modules. Entrepreneur Ján Jurčo and his **JJ Electronic** found his niche in high end electron tubes manufacturing for high end sound equipment.

**Precision Apparatus Manufacturing (OKEČ 33)** belongs currently to sub- industries with lesser weight in the electronics industry. While only parts of this industry belong with electronics (the rest is classified as mechanical engineering), this sub-industry generates relatively high ratio of value added and strong profitability. The sector is dominated by mid- and small sized companies. **PPA Controll** is one of the largest groups of companies in this classification, manufacturing for example low-voltage distribution systems. A growing manufacturer of unique gas meters **Elster** has its facilities located in Stara Tura. The company was formerly known as Premagas and is rapidly expanding not only as consequence of investment flow from its German parent company. **ZTS Elektronika** in Nova Dubnica specializes in manufacturing of specialized transformers that are currently being supplied to nearby Delta, together with cable harnesses, electric coils and other electronic components. Growth is expected from **GE Sensing & Inspection Technologies**, in Nove Mesto, a manufacturer of special ultrasound probes.

## Impact of the Recession on the Slovak Electronics Industry

Steep decline in the economy was felt by majority of companies in the industry by the end of 2008. Depending on suppliers and product range, some felt it earlier than others, however, an absolute majority felt the declining orders by September, the trend peaking in December, with uncertainty carried over into 2009. Some companies saw declines in new orders reaching 40%, typically less, rarely even more. The biggest declines were felt by exporters to European markets and Russia, but also manufacturers for the automotive industry.

The worst drops in new orders were suffered by companies manufacturing parts and components and suppliers of other inputs. Finished product manufacturers minimized their inventory to avoid tying up too much cash. Consumer demand did not falter at the same pace as industrial demand and companies like Samsung or Sony felt practically no effect of the recession on an annual basis, since the impending crisis was not reflected in their Xmas orders from retail. Samsung, in fact, manufactured 50% TVs more than in the same period of the preceding year, however, due to the declining pricing on these TVs, revenues from their sale increased only by 20% and on an annual basis revenues increased only marginally.

The wake up call came for many people first in January. While production volumes did not decrease, the industry operates under strong price competition and with fast price decline (previously mitigated by large volume increases) came steep drop in profitability. Most companies started contemplating cost-cutting measures and even layoffs.

Recession's effect on electronics industry in 2009 is felt in multiple ways. Some companies see it as a threat, others as an opportunity. Some see it as both a threat and an opportunity. There is not enough data available to analyze the impact of the current recession on individual segments of the industry, at least for now. This chapter will therefore focus on the effect of the recession on two highest weighted sub-industries: First, cable harnesses manufacturers (predominantly for automotive industry), the largest employer in the electronic industry and second, TV manufacturers, the largest revenue and exports generators.

For suppliers to automotive industry, which is a substantial portion of the industry, not only did they feel the impact first, it was also much deeper than for other manufacturers in the industry. Supplies for the automotive industry started declining already in the summer of 2008. The spreading financial crisis escalated economic slowdown, and by the fall of 2008, companies were facing cuts in new orders by tens of percent.

Cable harnesses manufacturers, with the highest proportion of labour inputs already faced difficult situation when the Slovak Koruna appreciated in value and when this strong conversion rate was later fixed for conversion into Euro. It is not surprising, that given the pace of labour cost increases, they were the first ones to report massive layoffs at the end of 2008. A 20% decline in orders at the beginning of 2009 opened the way to decreases in employment.

The largest cable harnesses manufacturer – **SE Bordnetze** (a supplier for Volkswagen, Škoda, Audi) is closing its facility in Zlate Moravce and is relocating its production to its larger facility in Nitra. Layoffs were also reported from **Delphi** (Peugeot, Citroën, and Mercedes) in Senica, **Yazaki** (Chrysler, Ford, Jaguar, Mazda, Peugeot, and Citroën) in Michalovce, or **JAS Elmonte** (Jaguar) in Snina. Only the Korean **Yura** (former Sewon) did not experience a drop in orders, as cuts from Kia were offset by ramping up production at Hyundai in Nošovice, Czech Republic. An exodus was reported by **Connect Systems** in Vráble (relocating to lower cost Romania), **FCT Electronic** in Prešov (dropped car cable manufacturing at year-end) and also leaving is one of the largest employers of the industrial park in Kechnec in Eastern Slovakia - **Molex**. Its cables, car connectors and electronic devices manufacturing for Nokia, Siemens or Sony will be relocated to lower cost China.

The recession was not necessarily the cause for cable production cuts or relocations, but certainly was an aggravating factor. The largest part of current cable production will remain in Slovakia and not only the ones closely tied to local car manufacturers. Significant portions of their production is being exported for example to Germany, and German car manufacturers might not be able to meet their Just in Time inventory objectives should their supplies come from more distant (and cheaper) corners of Europe.

The demand for products of large Slovak consumer electronics manufacturers **Panasonic** (DVD-, Blu-ray players and recorders), and also **Osram** (interior light bulbs) is rebounding back to levels from before the first strike of the recession. The most interesting developments can be seen through the lens of the recession in the highest weighted segment of the electronics industry – TV manufacturing.

Cost cutting and manufacturing streamlining had its most significant impact on **Samsung** in Galanta. Due to the strong conversion rate vs. the depreciated Forint, it became more expensive in Euro terms than its parent in Hungary. Because of this and also due to logistical optimization the Korean head office ordered production transfer of some of the product ranges from Slovakia to Hungary. The transfer was finalized in April of 2009, including plasma TVs from the Galanta facility south to Hungary. Plasma TVs made only approximately 20% of the almost 6 million TVs manufactured at this facility last year. However, there is already a replacement with more perspective planned. Manufacturing LED televisions during times of a recession is a daring strategy and is a part of a worldwide pilot program of Samsung. Similar production was started at Sony in Nitra – the assembly of LED LCD and EDGE, LED LCD TVs. Besides Slovakia, LED televisions are also being assembled in Poland – under the **LG** and **Philips** brands. Many other European competitors are still in the preparation stages for LED TV manufacturing. Samsung in Galanta has been trying to rid itself off the "manufacturing and assembly only" label for some time. Introduction of more innovations should take this subsidiary closer to becoming a design and development centre.

After initially experiencing a slowdown at the beginning of 2009, Sony, located in Nitra, experienced strong growth in the second quarter. To meet the demand, it kept some older product models alive. However, swings in demand make it difficult to plan and optimize capacity utilization. Sony is expecting to produce approximately four million TV units – the same as the year before.

Globally, besides layoffs, Sony is also planning closing several of its production facilities. Since the beginning of the Sony project in Nitra TREND Analyses forecasted a complete relocation of TV manufacturing from Barcelona. The recessionary pricing pressures should accelerate this process. The latest news from Sony insiders indicate that the Barcelona facility will at least finish the current fiscal year (ending March 31, 2010). The production facility in Nitra had long nurtured the ambition to be, besides manufacturing TVs for the rest of Europe, in charge of the European design and development centre. However, Sony decision makers decided that the main design centre should be in Malaysia and only support activities should be carried out in Nitra. The facility in Nitra is prepared to accept additional production with a new facility extension, which for the time being can serve as a storage facility. Final production transfer to Nitra could trigger the mammoth 240 million Euros investment, currently put on hold.

Changing consumer preferences benefit another TV manufacturer located in Slovakia - **Universal Media Corporation Slovakia** (UMC). Its low-end smaller-screen LCD TVs, manufactured under the store brands (e.g.: Tesco etc.), are increasingly popular especially in the

U.K. While the 2008 production volume hit half a million units, this year should see the volumes doubled. The company is also starting to manufacture the most popular sizes – with 32- to 46-inch screens, and is expanding its markets, including German, French, Hungarian, Austrian, Czech, Italian or Spanish markets. Within five years, the company would like to manufacture five million units per year and hire one thousand additional workers. Moreover, they are planning to attract additional foreign, particularly Chinese, investors/suppliers to Nové Mesto nad Váhom.

From the perspective of the Slovak electronics industry, the recession could mean acceleration of the current and expected trends. Besides the inevitable loss of unsophisticated productions, which in some regions, actually, releases workforce currently in short supply for other/new manufacturers. As a result, we could see a more diverse Slovak portfolio of products and companies. Slovakia is, thanks to its favourable geographical location, decent infrastructure, good workforce supply, available European Union structural funds and zero foreign exchange risk and cost vs. most other European countries, a very attractive destination for foreign direct investments. It is paramount to keep its good reputation intact by avoiding steps that could damage its business environment, or send out negative signals about the unpredictability of courts, government offices or legislation affecting business.

Among other large electronics manufacturers scouting Slovakia for desirable sites for their new production facilities are LG Electronics and also some Japanese corporations. Since these are no longer suppliers to the automotive sector, their investment could mean greater variety of domestic electronics industry.

Newcomers and established companies will, in the long run, besides having their manufacturing activities in Slovakia, have to plan for research and development that would use the domestic intellectual potential to a greater extent than it is currently done. That is the only way of attracting the best and brightest of the graduates of the Slovak universities, who in the absence of a challenge in the domestic electronics sector, choose IT sector or work abroad instead. To be truly competitive, whether in their respective markets or within their group of companies, the local companies will have to develop at least some design, engineering and research and development capacities of their own.

## Electronics Industry Trends

After reviewing the 2008 financial results, it is obvious that profitability appears to be industry's weak spot. In fact, profitability shows a decreasing trend. Even though the volumes produced by the industry continually grow, profits and value added are either stagnant or decreasing. Constant advances in consumer electronics renders current models obsolete quickly, which puts manufacturers under price pressure faster than ever before. Thanks to intense competition in the marketplace, manufacturers are not able to transfer cost increases to their retail customers.

There are, perhaps, also some side benefits to the recession – after hitting all time highs, prices of steel and oil (to which prices of plastics are tied) in the first half of 2008 – the recession significantly cut prices of these materials. However, even significantly cheaper inputs can not compensate for lower sales volumes and lower unit prices. For example, the prices of inputs to LCD TV manufacturers declined slower than the prices of the finished TVs in 2008 and 2009. Labour costs increased by tens of percent, and since most manufacturers strategically try to move their manufacturing to lower cost countries, especially the labour intensive manufacturing, a few electronic products manufacturers left Slovakia for lower labour cost countries. Costs can decrease also by decreasing the time involved in manufacturing and transportation of materials and semi-finished products. Increasing logistical availability in tandem with shortened supply routes force electronics companies to manufacture as close as possible to their target markets. The labour component in household appliances is smaller and transportation between continents more complicated. Therefore, the manufacturing is not centralized globally, but instead within each continent or its parts. Finished product manufacturing should accordingly not leave Slovakia further East, at least not if longer supply routes could result in delays. Russian market is typically being supplied by local subsidiaries of foreign companies directly. It would be difficult and costly to supply markets in Central and Western Europe. Additionally, foreign investors expect local area demand to pick up as it matures, even if most of the facility output at present is export bound. According to iSuppli estimates (an electronics sales market research and prognosis company), Central and Eastern Europe should be the fastest growing region in Europe in terms of LCD TV sales.

While some sectors face a very evident transfer of production capacities further East, especially to China and Vietnam, it is not as simple to do this for an electronics manufacturer. The European Union has been implementing duties and tariffs on some TV parts, an finished TVs to protect domestic TV manufacturing. These duties coupled with transportation costs put these imports at so much competitive disadvantage, that the first Chinese companies started scouting possible production sites in Europe. That would put them closer to their customers and remove significant shipping delays (weeks to months by cargo ships). Two of UMC's suppliers should announce their new production facilities in Slovakia as early as this year.

Profitability in this dynamic industry can only achieved by constant innovation. Only companies that invest into innovation have a chance to secure survival and prosperity in the long run. Management of some of the Slovak subsidiaries is trying to attract also activities with higher value added. The work of design, engineering and research and development centres is valuable enough to keep the production facilities in Slovakia, provided their production remains efficient and of high quality. Semikron, in cooperation with its parent company in Germany, is one of such innovative companies. The management of Samsung in Galanta is aware, that most production activities within Samsung will be outsourced globally and even some of their own inputs are being outsourced to both Slovak and foreign companies. Globally, Samsung will keep the more sophisticated activities and builds its brand name. That is why, the subsidiary management in Galanta has an ambition to start creating their own designs and is aggressively introducing new products. They were the first Samsung production facility to start LED TV production.

## Alternative Energy Sources

It is especially during recessions that investors seek safe investment opportunities. As a result of the European policies and attitudes, there are many such opportunities available within the electronics industry – especially in alternative (renewable) energy sources. The numbers of green investments has been rising recently, also thanks to the support from various structural funds and grants. Slovak electronics could greatly benefit from this trend, and manufacturing of the modules for alternative energy use or their components has a great business potential. Slovak electronics companies are so far not sufficiently innovative in this field and do not currently even supply manufacturers in Western Europe. Foreign investors still do not invest in the field outside their domestic markets unless they find regions with exceptionally high demand.

Despite its potential in wind energy, there is no larger electronics company supplying wind power generating plants at minimum with components. German companies are the most advanced innovators in this field in Europe. A variety of bearings for their wind power products are being supplied by PSL, a Thyssen Krupp subsidiary in Povazska Bystrica. Suppliers from electronics industry are not known.

It appears that Slovak companies will find themselves more involved in solar energy. **Thermo/Solar** in Žiar nad Hronom is planning to double its volumes in 2009, resulting in production of 300 thousand square metres of flat thermal solar collectors. Within the next four years the number could be increased to 500 thousand square metres. Thermo/Solar already is the largest producer of solar collectors in countries of Central and Eastern Europe. The company was founded originally as a joint venture of Závod SNP in Žiar nad Hronom and the German Thermo/Solar in Regensburg. Today, under the name of Thermo/Solar the company gives work to one hundred workers and is owned by two individuals. Only one tenth of its production is sold in Slovakia, the rest is exported to other European markets.

There were other garage start-ups in the solar energy field, but not all could endure the pressure of foreign competition and some became importers of solar energy products. **Ecora** in Moravské Lieskové ceased manufacturing solar collectors and remains a sales and service organization. **Nitria** in Nitra, besides its radiator assembly line started a production of internal solar collector components. **Ultraplast** in Lipany ceased manufacturing its own solar collectors and only sells imported solar systems at present.

**Schener** in Trenčín, designed its own vacuum tube collectors this year and plans to sell them in domestic market, but mainly in Western Europe and in the Southern parts of the continent. Interestingly, this company started as an importer of collectors from China, but is exclusively focusing on its own product line now while importing some of its components from Germany.

Böhm Electronic Systems Slovakia in Nove Mesto, originally a manufacturer of machinery for CDs and DVDs, even began manufacturing machinery for manufacturing of photovoltaic cells in 2008 after being purchased by **Manz** from Germany. The company does not only sell the machinery, but uses it to manufacture its own line of photovoltaic cells, its main markets being Western Europe, the U.S., South Korea, Taiwan and China. Manz is looking for local subcontractors to its plant and would not rule out the possibility of manufacturing photovoltaic panels at this location.

Deliveries to manufacturers of "clean energy" equipment could also entice prospective Slovak electronics factories. This could be especially true of smaller parts and special customized components. Additional assembly factories of finished products in this field can be expected in Slovakia in the medium to long term, when Western companies start building additional capacities to meet increased demand. These will be, however, smaller scale operations. Larger scale could only be possible in case of increased interest in building photovoltaic power plants in Slovakia. Current government energy policies – or its policy implementing institutions – rule out wide-spread support for construction of wind and photovoltaic power plants in Slovakia in the coming years. Although, the current policy provides long-term guarantees of higher prices for purchases of electricity from renewable resources, but limits the approval of connection to the network to only a very small number of such sources.

# Electronics Industry Investments

**AU Optronics,** the world's third largest producer of LCD panels (or screens for LCD TVs) - according to unofficial information - decided to build its first European factory in Slovakia. The Company announced in 2007 that it plans to build an LCD plant in one of Central European countries - the Czech Republic, Slovakia or Poland. In Slovakia, a location near Trencin was selected. AU Optronics' investment should be around 200 million Euros, and the plant would provide employment to up to three thousand people. Trenčín also offers good logistical connections to potential clients in Slovakia (Samsung, Sony), in the Czech Republic (Panasonic and Foxconn) and in Poland (Toshiba). AU Optronics opened a service centre for LCD repairs in Brno.

**Chi Mei Optoelectronics Corp.** is also considering building an LCD plant in Slovakia. The company is in the "decision-making stage". It is possible that rapidly falling prices and recession driven weakening of demand in Europe might discourage the investment decision. Should a decision to invest be made, it could be in the amount of around 200 million Euros. Given the need for approximately three thousand workers and the high density of the same productions in the Western part of the country (requiring the same worker qualifications), it is likely that the Taiwanese investor is planning the location of the factory to be either Central or Eastern Slovakia. Chi Mei Optoelectronics is a financially strong producer of electrical and smaller electronic components and LCD panels are its signature product. Unlike large manufacturers with in-house development, with focus on increasingly larger-sized LCD screens (Samsung, Sharp, Siemens, Sony), Chi Mei's specialty are smaller screens used for smaller TV sets, and particularly PC monitors and laptop screens.

Austrian car battery manufacturer **Banner** indicated already in 2007 the intention to build a factory in Kostolne Klacany village near Dunajska Streda. Delays in construction and project were caused by protests from local residents (fears of ecological damage), as well as some political disagreement at the municipal level. The investor is likely to receive the necessary permits in 2009 and start construction. Banner intends to invest 33 million Euros in the first phase and double the amount overall. Approximately 100 people should find employment in the first phase.

**TRW Steering Systems Slovakia**, a manufacturer of electric motors for power steering systems, is planning to expand its new manufacturing plant in Nove Mesto nad Vahom. A second large hall should be added to the existing factory building. Investment costs of the construction and the technology together should exceed 10 million Euros. The construction of the new hall was supposed to start by early 2009; however, uncertainty about future supplies to the car factories put the plans on hold indefinitely. The entire production from the plant in Nove Mesto is for exports, especially to Poland, Germany, Spain and Japan.

A subsidiary of the German company **Hydac** is planning to build its two new factory halls in Krasna Hôrka near Tvrdošín. The factory manufactures electromagnets for industry and automotive sectors. The company wanted to begin the construction of the first hall in the spring of 2009, but the recession put a temporary stop on the investment. After the rebound in demand the company expects to finish the construction process, for which the company already has its building permits. The investment exceeds 10 million Euros. Approximately one hundred people should find employment here, in addition to the existing 120 workers. Hydac products are used in controls for hydraulic machines, and also in car stabilizers.

**General Electric** also has a subsidiary in Slovakia through its Sensing & Inspection Technologies Division. The subsidiary was planning to purchase the leased building together with two production halls and build an additional hall in 2009. The recession, however, put the project on hold until 2010. The investment is likely to exceed 5 million Euros and within five years should create nearly 100 new jobs; the number of employees today is approximately eighty. Current production program consists of (besides manufacturing of special components for probes) non-destructive ultrasound probes. More than two hundred types of probes are produced, in small series production. Among GE's new projects will be manufacturing of equipment for testing of aircraft discs, ultrasound thickness measuring device and an expanded assortment of manufactured probes.

Swiss-Finnish Electronics venture **Enics** acquired from ZTS Dubnica not only premises but also the technology for medical and industrial electronics. It is currently employing 200 people and planning to increase their numbers to up to 600 within four years. The expansion of production means an investment of tens of millions of Euros.

The Italian corporation **Sisme** built a new factory in Maly Krtíš. It has been manufacturing electric motors, stators and rotors there since the early 2009, which are then supplied to manufacturers of compressors for refrigeration. The company did not disclose the amount of their investment; the total number of employees is 150.

**Kissling**, a German corporation, would like to add to its operations in Rimavska Sobota. It had planned to start with the construction of a new factory addition for more than 3 million Euros at the end of 2008, however because of drops in orders the German parent company put a hold on the investment. A change in the decision can be expected once long-term orders are secured. This expansion should provide 70 additional jobs in the area. Kissling Slovakia produces micro switches, switches and relays for transportation and agricultural equipment.

**Electro-Straško**, a manufacturer of power distribution devices in Šurany, has plans to build a new larger factory in that city. Current product range manufactured with only twenty employees includes boxes for meters, connectors and breakers. Due to the booming business, larger premises are required. The amount of investment was not disclosed, but the new operation should offer jobs opportunities to 50 employees, i.e. two and half times its current numbers.

Slovakia based **Tesla Liptovsky Hradok** is in the process of investing 1.5 million Euros in expansion and upgrading of production of printed circuit boards. Half of the amount comes from structural funds of the EU. The company purchased new machines and technology for final assembly its circuit boards. In addition to improved productivity, the enterprise is expecting, to increase the proportion of its electronic production. Currently, up to seventy percent of the total company revenues come from non-electronics production (the company was founded as an electronics manufacturer only). Tesla generated sales of more than 12 million Euros, and reported a minor loss in 2008.

**Alcatel-Lucent**, a French-American company, is investing a minimum of 330 thousand Euros into the expansion of its laboratories in Liptovský Hrádok. The current premises of the service center for telecommunications technology were expanded with a large telecommunications laboratory. The company previously employed 60 service engineers in two laboratories there. Their number has increased only by one tenth this year; a significant boost in employment is not expected. The company continuously invests considerable resources to maintain the top quality of the service centre. It services digital telecommunication networks throughout the EMEA region (Europe, Middle East, and Africa). The first investment in Slovakia dates from 1991, when the company formed a joint venture with Tesla Liptovský Hradok to manufacture digital switchboards. The production was halted in 2001. A part of that manufacturing was transferred to another company – Tecwings. Alcatel's other areas are developing and servicing of electronics and software - not only in the Liptov region, but also in Bratislava.

**OMS**, a Slovak manufacturer of lamps in the Záhorie region, is replacing its old Design Centre in the same location. The Funny Interactive Lighting Solution Centre, as it was aptly named by the owner, should become operational this year. The developers were temporarily moved into OMS administrative building. Ten additional employees - especially designers, lighting solution experts and design engineers should join the present team of ten designers after the completion of the development centre. The new centre, including equipment will cost more than 2 million Euros. OMS manufactures lamps under its own brand name and provides employment to approximately 700 workers. Production should be increasingly more automated and robotized.

**Hoppecke Batterien**, a German investor, is planning to build a manufacturing facility for industrial batteries for approximately 27 million Euros (construction cost + technology) in the village of Rybany near Bánovce nad Bebravou. This factory will be the fifth operation of Hoppecke family group. Three of them are located in Germany and one in China. The factory in Slovakia should employ around 240 people. Construction works should start late next year; the investor is assuming production launch at the beginning of 2011. The Slovak operation will manufacture batteries for power backup sources, uninterruptible power systems, as well as handling technology. Intended customers are power generating/distribution companies and manufacturers of handling technology.

The former Molex plant in Kechnec near Kosice will be taken over by one of its largest suppliers - **IEE Sensing** of Luxembourg. The company will invest 4.2 million Euros and hire 350 employees. The company received subsidies in the amount of 2.1 million Euros from the government, mostly in the form of tax breaks. The subsidiary, under the name IEE Sensing Slovakia, will be manufacturing sensing and detection systems for cars, such as airbag activators. It is a higher value added production per employee than it was in the case of departing Molex. While IEE Sensing belongs to the long list of suppliers to automotive industry, it should not be as sensitive to salary increases as manufacturers of cable harnesses. Its first products should be produced in the revamped factory already this year.

**Universal Media Corporation (Slovakia)** is preparing its production capacity expansion in Nove Mesto nad Vahom. The corporation, manufacturing LCD TVs under its Sky brand and other retailers brand names (e.g. Tesco), is planning to multiply the production capacity and hire additional one thousand new on top of the current five hundred employees in the next five years. As a result, UMC is planning to purchase eight new assembly lines and complete storage facilities for a total investment of around ten million Euros. The total production volume is expected to increase by up to one hundred percent in 2009, which should translate into making of about one million TV sets, or about ten percent of Slovakia's entire TV production (dominated by Samsung and Sony factories). Within five years, UMC would like to produce up to 5 million TV sets annually.

In addition to already operational assembly of LCD TVs, the company intends to begin manufacturing TV's main components - LCD panels in 2010 - for use in their own TVs and possibly for other factories in the TV assembly business in Europe. Currently, UMC buys the larger panels from Samsung Electronics in Voderady, and smaller than 32 inches sizes from factories in South Korea and China. The overseas supply of panels of smaller sizes should be replaced from UMC's own production. The plans for LCD panel production are being prepared in collaboration with Samsung. Since probably only simpler operations are involved in manufacturing of the panels, UMC should be ready for the launch early next year. A minimum of two million Euros will be invested into assembly lines and additional four million Euros will be required for building of a new warehouse of 10 thousand meters square in company's complex. Parts of the existing hall, which have been used as a warehouse, will be transformed into production facilities, after conversion into cleanroom environment necessary for the production of panels. UMC still intends to purchase the majority - over two thirds - of panels from Samsung. According to the plan, around 600 thousand LCD panels should be manufactured next year and almost one million in 2011. This production range expansion will create about 100 to 150 new jobs.

In addition to its own expansion plans, UMC seeks to attract its Chinese subcontractors that produce plastic components and printed circuit boards for its LCD products. These new factories could employ about one thousand workers. Nove Mesto nad Vahom could thus grow into another LCD cluster.

Slovakia based **Avex Production** planned and investments of approximately 2 million Euros into expansion of its factory in Oravska Lesna by the end of 2009. Avex already invested over one million Euros in this manufacturing facility for electronic components since the early 2009, and two million Euros last year to expand its production facilities. The originally plan was to build a completely new factory in Senec. Market turbulence caused by the recession put a hold on this project. Construction in Senec is likely to begin at the end of this year. Due to the growing demand for products from Avex's largest customer - Samsung Electronics - the company must for now at least extend its current facilities in Oravska Lesna, which once belonged to OTF. Avex Production should produce up to three times as many modules and products this year as it produced last year. Avex also does custom manufacturing for many foreign corporations, particularly ones from Germany. For its main customer – Samsung - Avex manufactures products such as DVD players or satellite receivers, however, Avex does not assemble these into a finished product. Once the new plant in Senec with its two high capacity assemblyl lines is completed, assembly of the finished product should be included. Temporary expansion investment in Oravska Lesna is a stop-gap measure to allow for purchase of technology and to expand the existing warehouse space, however this facility allows for no more future expansions.

**Samsung Electronics Slovakia** in Galanta is planning, despite the recession, to invest 35 million Euros this year. Most of this amount has gone towards factory reconstruction finalized in May. The rest of the amount should be invested into automation of the LCD TV manufacturing.

Because the assembly itself is already automated, the investment will go mostly toward entry and exit operations (e.g. purchase of transportation vehicles etc.).

## Investors Relocating Abroad

Existing investors typically do not relocate from Slovakia on large scale and this positive investment balance should be maintained for some time to come. Strong conversion rate into Euro, rising wage levels, and also temporary weakening of the national currencies of the neighbouring countries in 2008 however, brought a first few cases of relocations abroad. In particular, some manufacturers of cable harnesses began moving relatively unsophisticated production to countries with less expensive labour, or from the West to the East and South of Slovakia. Most manufacturers of cable harnesses for the automotive industry, however, are likely to remain in Slovakia as their harnesses are customized to each car manufacturer and must be supplied using the just-in-time inventory management method to factories in Slovakia and its vicinity. The 2008 economic meltdown and uncertainty about future accelerated the process of low cost and low value added per employee production relocation.

Manufacturers of cable harnesses were among the first ones to start considering layoffs and later on closing plants as a result of the recession. **SE Bordnetze** is closing its factory in Zlate Moravce and shifting its production to a larger factory in Nitra, where it will continue manufacturing for Skoda, Audi and Volkswagen. A full withdrawal was announced by **Connect Systems** in Vrable, heading to lower cost Romania. **FCT Electronic** in Presov ended its cable harnesses production in late 2008.

The U.S. **Molex,** a manufacturer of cable harnesses, connectors for cars, as well as for Nokia, Sony and Siemens in Kechnec, to a huge decline in automotive orders and price pressures and is relocating its production to still lower cost China. About one thousand employees, mostly women will lose their jobs by the end of 2009. As of 2000, Molex was the first investor in Slovakia's largest industrial park in Kechnec. **Moles**, its subsidiary, relocated its production to its own facilities in Sulecin, Poland already in 2006. .

**On Semiconductor** used to have one of most sophisticated electronics manufacturing factories in Slovakia, but it ended production of integrated circuits and only leaves its global support centre for EMEA and a part of America at its former location (of former Tesla Piestany). The original plans called for the machines to stop at the end of 2009, however, the recession accelerated the plans and the plant closed in July. The production shift is related to production concentration of semiconductor components in the group's larger factories, where permitted by their unused capacity. Machines will be moved to the factory in the Czech Republic and in Belgium, which will assume Slovak factory's production program. Approximately 400 people lost work in Piestany and about two hundred were left in the Global Support Center. Company's research and development department in Bratislava will remain intact.

Japanese group **Sony** left its old premises in Trnava in August of 2009, which even after relocating its TV manufacturing was left with European PlayStation Service Centre and the production of digital tuners. The service centre was moved to Great Britain and digital tuners were shifted to the Nitra facility. Trnava Logistic capacity was transferred to Sony's new addition in Nitra that was built for the currently suspended large production expansion. These new manufacturing facilities will temporarily serve as a warehouse. Sony intends to keep its Trnava location, which could in the future, and after relocation of production from Barcelona, once again serve as a logistical center.

The past sharp price decreases of CRT TV's and now LCD TVs complicated **OVP Orava's** position**.** While global players, typically, spread their business risk over a broad portfolio of consumer electronics, this domestic producer was an exclusive manufacturer of televisions. The company sought to improve its position by cooperation with Asian manufacturers of LCD TVs, who wanted to establish themselves in the markets of the European Union and were looking for alliances. OVP started production of its first LCD TVs in 2005 in cooperation with Teco Electric & Machinery in Taiwan. This cooperation ended in 2007. Negotiations on cooperation in development and manufacturing of LCD TVs with Golan Technology Corporation also failed in March of 2007. OVP TV's are built using Philips and Thompson components. Although the owners of the company always refused to sell to foreign investors the company has always been largely dependent on cooperation with them. The company reduced the number of employees from two hundred to eighty in the summer of 2007. Production has been reduced to a minimum, and the majority of production capacity was offered to be leased out. At the end of April 2008 the production ceased completely. The company is constantly looking for foreign firms to lease out facilities or for cooperation.

## Major Electronics Manufacturers in Slovakia

**Samsung Electronics Slovakia** is the largest electronics manufacturer in Slovakia and has been for the past couple of years. Since its production launch in 2002 and until 2007 its revenues grew rapidly each year until the growth stopped last year. In Euro terms, revenues have increased by three percent to 3.4 billion Euros, but in SKK terms, due to the currency's appreciation, revenues fell by more than four percent to SKK 106 billion in 2008 (using average 2007 and 2008 exchange rates). Company's operating results were much more affected. For the first time in its history the company reported a net loss of 31 million Euros, while two years ago still reported an after tax profit of almost 106 million Euros. This first factory of Samsung Electronics in Slovakia manufactures mainly LCD and LED TVs, LCD monitors, MP3 players, and DVD recorders, Blu-ray players, home theatre systems and other household appliances. Last year's total production volume was 9.6 million units, of which 5.9 million units were televisions. Televisions account for 85 percent of sales; two years ago it was 75 percent.

Earlier this year Samsung headquarters relocated production of Plasma televisions from Galanta to their Hungarian factory, since weakening of the Forint made the production there more cost-effective. The factory in Galanta launched manufacturing of LED TVs and also should receive all production of LCD TVs from other locations. Although Samsung sold comparable numbers of LCD TVs in Europe this year as in the year before, the fact that Galanta factory switched to a single shift indicates that a significant part of its production of other small appliances (given the current cost advantage of manufacturing in a country with a weakened currency) was also relocated from the factory in Slovakia to Hungary. Samsung Electronics Slovakia in Galanta employed on average nearly 4700 people last year, two hundred more than in 2007. Less than three thousand are full-time employees and over one third subcontracted through agencies. Almost all of Samsung's production is exported; only around one percent of its production is sold in the domestic market. Exports end up particularly in the affluent markets of Western Europe. The production process was fundamentally changed in 2008 - so-called "cell lines" were introduced. Simply put, this means that the product is assembled and tested by one or two employees, which gives employees more responsibility (it is very clear who is responsible for any particular product fault) and is also more efficient; declared growth is up to 20 percent. This efficiency increase means the company needs fewer workers. Its three thousand full-time employees are all that is going to be necessary, the rest, subcontracted through agencies will no longer be needed. The shedding of contract employees is to some degree linked to relocation of some production (e.g. satellite receivers) to Hungary.

**Sony Slovakia** completed the relocation of its factory from Trnava to Nitra in 2008, which began in mid-2007. Sony kept the large Trnava site, which once used to be a warehouse for the manufacturing coop Jednota. Up until August of 2009 Trnava site was a production site for LCD TV digital tuners and the European service centre for their PlayStation console. Nitra industrial park is the host of Sony's largest TV manufacturing factory worldwide. The largest global market for LCD TVs - Europe – demands more TVs and consequently, the 2007 production of 2 million units was increased to nearly 4 million TVs in 2008. Estimates suggest these volumes could be maintained for 2009. Revenues jumped by more than forty percent to SKK 42 billion (1.4 billion Euros) in 2008. Currently, Sony Slovakia has around 3 000 employees. Last year the company announced an investment of over 240 million Euros, which is three times the cumulative amount invested up until now. The mammoth size of the investment indicates that it will not be only an increase in capacity but also an expansion of the manufacturing process. The investment has been on hold since December of 2008 due to the recession. The only part of the investment Sony managed to finish during its preparatory phase is the extension of the production hall, serving as a temporary warehouse. Sony has already prepared other parts of the site for coming expansion. It is expected that Sony will increase the volume of LCD TVs produced to over 10 million units a year in a couple of years. Similarly, number of employees should more than double to 7 thousand. Sony Slovakia should absorb the production of the Barcelona factory expected to be closed next year. It has half the capacity of the Nitra facility and a design centre. The design centre should be relocated to Nitra as well, albeit only partially, as Sony is creating a global design centre in Malaysia. Sony launched a logistical centre for Central and Eastern Europe at its plant in Nitra in the fall of 2008. Roughly 60 percent of Sony's production in Nitra is sold in Western Europe; the rest is sold in the less affluent Central and Eastern part of the continent.

**Samsung Electronics LCD Slovakia** – the largest new investment of the Slovak manufacturing sector of 2007 – launched its production in January of 2008. Voderady near

Trnava became Slovak capital of LCD panels (the screens for LCD TVs) manufacturing. Demand for these panels is so high, that the Korean manufacturers' customers have been pushing for higher production volumes right from the start. The plant should therefore reach its full capacity of ten million panels a year already in 2010, and not in 2012, as originally projected. Samsung still plans to invest additional 320 million Euros to make it the largest of its kind in Europe. The two original assembly lines, operational since the beginning of 2008, were expanded by two more in the fall and since the spring of 2009 six assembly lines are being used. Approximately 1110 workers are currently employed here. Samsung Electronics LCD Slovakia produced two million LCD panels during its first year and it should be more than 6 million panels this year. At the moment, the Voderady facility produces 32-inch and 40-inch panels, but in 2010 the plant should already produce all traditionally sized LCD panels. The largest portion of the production is going to Samsung in Galanta and Sony in Nitra. Deliveries to UMC in Nove Mesto nad Vahom factory and internationally - to Spain and Turkey were launched in 2009. The plant should operate at full capacity, using all 12 assembly lines to produce approximately ten million panels annually (almost one third of the current European consumption) already in 2010. At full production capacity, around 30 per cent of panels should be exported. Although Samsung officially does not admit any further capacity expansions, they can be expected. It owns enough land in Voderady to construct two more production halls, production from which could increase its future output of LCD panels to 20 million units annually. Also, the factory's infrastructure is built for significantly higher capacities than officially declared, including other subcontractors.

Japanese **Panasonic** group has two subsidiaries in Slovakia. Both maintain major positions in the Slovak electronic manufacturing. Panasonic AVC Networks Slovakia in Krompachy ranks fifth largest of the Slovak electronics industry by its 2008 sales. It manufactures DVD players and recorders, Blu-ray players and since April 2009 also Blu-ray recorders. After strong growth in sales by more than 25% in 2007 to almost SKK 7.7 billion, last year's declined to less than SKK 5.6 billion (186 million Euros). Panasonic tried to hold employment steady despite the 20 % slump in orders, however at end of 2008, laid off almost one third of employees. Since company orders stabilized by March, 140 (out of the 450 laid off) workers were re-hired in May. Panasonic AVC Networks Slovakia employs approximately one thousand people, about one-tenth less than a year ago.

The second Panasonic subsidiary has smaller revenues but larger number of employees and is located in Trstena in the Orava Region. Panasonic Electronic Devices Slovakia, s.r.o., currently has two manufacturing plants located in Trstena and Stara Lubovna. The total number of employees was on average 1460 as of last year, approximately 100 less than in the prior year. Current levels are still lower by about 300 employees. After strong growth in revenues in 2007 the company increased its revenues only slightly in 2008, to almost SKK 3.4 billion (112 million Euros). The management intends to maintain this level of performance for 2009. The company produces control panels, power supplies, tuners, chargers, remote controls, as well as iPod adapters, and car speakers. Steering wheel mounted controls for Toyota were added in 2008. The company launched its own production of plastic components for its products to secure greater reliability of supplies in 2009. Almost 95 percent its production is being exported, especially to Western markets. Its main customers are other Panasonic companies, domestic appliances manufacturers, and car manufacturers. Deliveries to automotive sector total twenty percent of company's revenues, their share is gradually increasing.

**Osram** (of Siemens Group) factory in Nove Zámky belongs to the largest and most significant within the group of this world leader in light bulb manufacturing. Nearly eight hundred people began manufacturing traditional incandescent bulbs in the old Tesla factory in 1995. Incandescent light bulbs are now only a small part of a production dominated by gas discharge bulbs and fluorescent bulbs for modern lighting. General lighting manufacturing still dominates and employs more than half of its 2200 employees. Nearly 400 employees work in manufacturing of car bulbs generating over 50 percent of annual production volume. They are auxiliary bulbs, for example for indicators, parking, reverse lights and the backlight for dashboard panels. Nearly 300 people work in the mechanical engineering section of the factory, which was not a part of the original Tesla. This division produces equipment for production of light bulbs and lamps exclusively for the Osram group. Osram's revenues continue to grow and jumped by a third to SKK 3.8 billion (126 million Euros) in 2008. This mostly relates to constantly shifting production from its German factories. The factory, located in Southern Slovakia, should be a recipient of additional productions from Germany and the USA this year.

The largest local producer of car lighting modules – a tandem of manufacturing plants of the German **Hella** family group **-** long grew due to new contracts acquisition from the local car manufacturers and orders from abroad. Year 2008, however brought a sharp decrease in deliveries for the automotive industry even for Hella. Revenues of Hella Slovakia Front Lighting in Kočovce declined by one fifth to just over SKK two billion (68 million Euros). The plant, operating in Slovakia since 2002, assembles conventional headlights and halogen light sources. The factory is a long-term supplier to Volkswagen, Skoda and also Daimler brand trucks. The company strengthened its domestic sales since 2006, when it began delivering headlights for Kia Cee'd, which is the principal product of the Korean carmaker's factory in Zilina. The company also won the contract for the new Citroen model C3 Picasso produced at PSA factory in Trnava. This Hella group plant currently employs five hundred people.

Rear and signal lights using LEDs are being manufactured by the group in Banovce nad Bebravou by a separate entity Hella Slovakia Signal Lighting, which has been in business since 2003. After the recent expansion, additional one hundred people found a job at this plant, bringing the total to nine hundred. Financial results for the year 2008 were not yet disclosed, as the company's fiscal year just ended in May of 2009. Complete tail lights for all Kia models manufactured in Zilina, are a dominant part of the production in Banovce.

The largest electronic company in Eastern Slovakia is **BSH Drives and Pumps** in Michalovce, which manufactures electric motors for household appliances, and is the largest supplier of drives for the BSH group, which includes Bosch, Siemens, Gaggenau, Neff, Thermador, Ufesa, Viva and Constructa. Almost 85 percent of its production goes to the group's factories, predominantly to Poland, followed by Germany, Spain, Turkey, Italy and the USA. Approximately 7.7 million electric motors were produced in 2007, 7.5 million in 2008 and the factory is planning to reduce production by 10 percent this year, as sales of household appliances have been declining as a result of the recession. This is partly reflected in revenues for last year, when they dropped from SKK 6.1 billion to SKK 5.3 billion (178 million Euros). The company, practically since its establishment in Slovakia, carried out its in-house research and development activities. In addition to making technical changes to the design of appliances, it is also developing an entirely new generation of motors. BSH Drives and Pumps employ over 1100 people in Michalovce.

The U.S. **Emerson** has long been active in Slovakia through two independent subsidiaries - Emerson Electric Slovakia, s.r.o., and Emerson a.s., - located at the premises of the former VUMA (Research Institute of Mechanization and Automation) in Nove Mesto nad Vahom. In late 2008, the group sold Emerson Electric and its electric motors (for household appliances) manufacturing, with its more than one thousand employees, to **Askoll.** Askoll acquired this way one of the largest factories for electric motors manufacturing in all of Central Europe. The 2008 sales declined by 15 percent to just over SKK 3.5 billion (118 million Euros).

Emerson a.s. - the larger of the original two plants in Slovakia - is partly a mechanical engineering and partly an electronic engineering company. Production includes complex activities like metalworking, not just a simple assembly. The company consists of six production divisions, or brands, and is one of the major European factories within Emerson group. Revenues more than doubled in 2008 (after prior year's sales plunge) to over SKK 5.7 billion (189 million Euros), mostly as a result changes in group's accounting. Current number of employees is nearly 1400 people; additional strong growth in sales or employment is not expected.

The German **Leoni** group has been established in Slovakia since 1992. In addition to its factories for cable harnesses manufacturing in Trencin, Ilava, Stara Tura and Trenčianska Tepla, it also has a factory for cables and connecting lines in Nová Dubnica. Leoni factories employ around five thousand people in total in Slovakia and the Group ranks among the top 10 largest employers of the Slovak manufacturing sector. The group is one of the largest employers in Povazie region in general. Total 2007 revenues for all Slovak subsidiaries reached nearly SKK 7 billion, remaining almost unchanged year-over-year. The 2008 financial results were - for now - released only by the group's largest businesses - Leoni Autokabel Slovakia in Trenčín. Its revenues declined - like all producers of cable harnesses - more than ten percent to SKK 4 billion (over 130 million Euros). Its profit fell by 30 percent, but the company is still profitable, a fact distinguishing it from other cable harnesses manufacturers. With its 3300 workers, the company is the third-largest employer of electronics industry, right after Samsung and Sony. Its factories in Trencin and Ilava produce cable harnesses mostly for Porsche and BMW.

LEONI Cable Slovakia, Ltd. in Stara Tura - another subsidiary of the same group - manufactures cables for telecommunications and medical electronics. Of its six hundred employees two years ago, the employment is down to 400 workers in total in its factories in Stara Tura and Trenčianska Tepla. Nearly seven hundred people are employed by Leoni Slovakia, s.r.o. in Nová Dubnica as of this year. They produce power cords for appliances, various other cables and battery connectors.

**SE Bordnetze** (formerly Volkswagen Electrical Systems) has been doing business in Slovakia for more than a decade. The primary cable supplier for the Volkswagen Group is currently producing only at its Nitra facility. A smaller factory in Zlate Moravce was closed in 2009 and its production program moved to Nitra. About four hundred employees lost their jobs because of the move. Besides delivering to Volkswagen factories the company also supplies other Volkswagen group brands - such as Porsche, Skoda and Audi. Part of the production is thus exported to Germany, Czech Republic, Hungary and Spain. The company keeps trimming numbers of workers - it currently employs over two thousand people - about one third less than in 2005 and 2006. Based on its 2008 sales, the company was the seventh largest electronics manufacturer in Slovakia with revenues of nearly SKK 5 billion (165 million Euros), its best year so far being 2006 with revenues of SKK 7.2 billion.

## SWOT Analysis

***Strengths***

- Strategic geographical location of Slovakia and acceptable labour costs
- Slovakia's admission to Eurocurrency zone eliminated currency risk against the Euro
- Sufficient number of industrial parks available to absorb new production facilities
- Long tradition and high quality of electronic engineering programs of the Slovak universities
- Industry status has long been that of significance and prestige and is still improving
- High level of diversification, both in terms of products and number of companies
- Both foreign and domestic investors are expanding, signalling satisfaction with their presence in Slovakia
- New car manufacturers and manufacturers of LCD televisions attract their suppliers to Slovakia and stabilize the strong base of cable harnesses manufacturers
- Other (than automotive and LCD related) companies are expanding as well (electrical motors for household appliances, electrical power supplies, IT etc.)
- Increasingly we are seeing innovative local companies with their own research and development especially in the IT sector.

***Weaknesses***

- Large share of low productivity low cost manual labour manufacturing
- Vocational and specialized schools cannot keep up with innovations and changing needs of the industry
- Low applied research and development potential of the Slovak educational institutions in the field

- Low level of cooperation between the companies, vocational schools, universities and research institutes
- Hi-tech manufacturing, research & development or customer service centres are being transferred to Slovakia only to a limited extent
- Limited independence of local subsidiaries of foreign companies
- Limited customer diversification of many companies, sometimes having only one or a couple of customers
- Despite having a variety of different product manufacturing, the industry ultimately heavily relies on supplies to automotive and LCD manufacturing industries

***Opportunities***

- Automotive industry growth affords new opportunities for component manufacturers
- Expansion in LCD TV and monitors manufacturing and concentration of manufacturing facilities for European markets in Slovakia and surrounding countries provides opportunities to many suppliers to the industry
- Import policies of the European Union force some manufacturers to transfer some of their manufacturing for the European markets from lower cost Asian countries to the EU
- Satisfied foreign investors might, in time, start more technologically sophisticated manufacturing, customer centres and research and development in Slovakia
- Strong SKK/Euro conversion rate made working abroad for some Slovak citizens less attractive - who in turn upon their return to Slovakia might find good use in customer support centres requiring good knowledge of foreign languages
- Untapped potential of electronics manufacturing experience and traditions in some areas of Central and Eastern Slovakia yet to be discovered by foreign investors
- Recession may increase the pace of production relocations from foreign parent companies to their Slovak subsidiaries
- Disappearing jobs with low productivity release qualified labour for use in higher productivity manufacturing
- Foundation of regional innovation centres and technological clusters, provided the European Union support funds are used effectively
- Software development capacity in respect to its use in new technologies

***Threats***

- Strong currency exchange rate between SKK/Euro can negatively affect manufacturing with low productivity and high domestic inputs (especially labour inputs)

- Recession in export markets can delay or completely halt expansion
- Lack of qualified labour, especially in the Western part of Slovakia, will increase input cost and deter investors.
- Poor communication of companies with specialized educational institutions will increase cost of hiring and training workforce.
- Lower manufacturing costs of cable harnesses in nearby Romania or Ukraine will decrease their manufacturing feasibility in Slovakia.
- Inability of companies and schools to capitalize on the potential for cooperation in areas of research and innovation.
- Decrease in demand and constant cost pressure in car manufacturing industry during recession can hasten production cuts or relocation of manufacturing facilities of the largest employers – cable harnesses manufacturers.
- Permanent devaluation of currencies of neighbouring countries vs. Euro could, temporarily or permanently cause production facility relocation to these lower cost countries.